CHAPTER 5: SYSTEM DEVELOPMENT

This chapter includes recommendations for the development of bicycle and pedestrian facilities and the protection of greenways. The future growth of College Station's transportation system, as determined by the Comprehensive Plan, will require the multi-modal design of new streets and the expansion of the bicycle, pedestrian, and greenway system. Planning for a multi-modal system can help alleviate congestion and reduce dependence on the automobile. Providing a well connected, safe, and accessible system to reach key destinations, such as work, school and home, can encourage bicycling and walking in the community. This chapter is organized by facility type followed by a section on policy recommendations

The horizon of this Plan is the next ten years. The study area evaluated includes the City limits of College Station and a five-mile radius around the City, known as the future Extraterritorial Jurisdiction. The projects proposed for implementation in the next ten years, however, are made up of a smaller study area, as described in Chapter 7: Implementation. Identifying facilities in the larger study area will help facilitate the long term success of the system.

Recommendations came from the citizen engagement process, which included three community meetings, focus group meetings, and an on-line survey as described in Chapter 3: Needs Assessment. The Technical Task Force and Staff Resource Team further refined the proposed system. Other factors that played a role in the proposed physical location of facilities included a lack of connectivity, traffic volumes, right-of-way availability, and the location of key destinations (i.e., schools, parks, major employers, shopping centers, etc.). Fieldwork and Geographic Information Systems (GIS) were also utilized in developing and analyzing the recommendations.

PLANNING SCOPE

The proposed system development recommendations (physical location of facilities) identified in this Plan includes bike lanes, bike routes, sidewalks, multi-use paths, and grade separated crossings. The conditions of these facilities such as the need to restripe a bike lane or replace a sidewalk were not considered as a part of this Plan. They will be evaluated during the implementation of this Plan. Other components that will require more in-depth evaluation and analysis include the following:

- Intersections (i.e., bicycle and pedestrian signalization and detection, ADA accessibility, crosswalks, curb ramps, etc.);
  - The termination of bike lanes before an intersection in some locations can be a hazard to bicyclists. These intersections will need to be identified and evaluated for improvements;
- Bicycle Parking (i.e., locations and need);
- Signage (i.e., locations and need for bicycle route signs, share the road signs, etc.);
- Greenways (i.e., trail heads, health of stream corridors, etc.); and
- Sidewalks (i.e., need for a sidewalk on more than one side of a street).

The recommendations proposed in this Plan are only at a conceptual level and will require additional planning analysis and evaluation before they reach design and construction. This process is described in more detail in Chapter 7: Implementation.

DESIGN

The Transportation chapter of the City's Comprehensive Plan has adopted the use of Context Sensitive Solutions to meet the City's transportation needs and support its land use and character objectives. It offers flexibility in designing facilities that are safe and effective for users while considering community and environmental goals. It also calls for public involvement early on and continuously throughout the planning and development process, which ensures that projects respond to the community's needs, values, and vision for the future. Context Sensitive Solutions considers the long-term needs of the community and will be used when implementing the system development recommendations made in this chapter.

The design of facilities will conform to local, state, and national standards and guidelines. National standards have been established by the Americans with Disabilities Act (ADA), the American Association of State Highway and Transportation Officials (AASHTO), and the Manual on Uniform Traffic Control Devices (MUTCD). AASHTO has documents that provide guidance for bicycle facilities (*The Guide for the Development of Bicycle Facilities*) and for pedestrian facilities (*The Planning, Design, and Operation of Pedestrian Facilities*). These documents provide significant flexibility in accomplishing the goals identified in this Plan and the objective to use Context Sensitive Solutions in design. Local standards include the Unified Development Ordinance and the Bryan/College Station Unified Design Manual. Appendix M: Design Considerations provides additional information that will be referenced to update local standards and guidelines.

A significant number of facilities are proposed in this Plan. The development of these facilities may be initiated by the City or triggered through private development. The development, costs and priorities of these facilities are discussed further in Chapter 7: Implementation.

BICYCLE FACILITY RECOMMENDATIONS

Facilities for bicyclists can include bike lanes, bike routes, and multi-use paths (greenway trails or side paths.) Bike lanes and bike routes are described below. Multi-use paths are discussed under greenways recommendations. As mentioned previously, a bicyclist has the same rights as a motorist to use a street as determined by state law. There are, however, many bicyclists who are uncomfortable on the street and require special accommodations such as bike lanes or bike routes.

A number of proposed street corridors will require additional evaluation and analysis before determining if a proposed facility can be accomplished. The addition of striping or signage may be all that is needed to achieve the proposed recommendations. Road diets, on the other hand, which involve reducing the number of travel lanes or lane widths to provide bike lanes, will need to be studied further. Additional information on road diets is available in Appendix M: Design Considerations.

Some streets requested through the citizen engagement process to have bicycle facilities have constrained right-of-way and may not be able to accommodate all types of bicyclists. Others will require additional evaluation and analysis to determine the best approach that is safe for motorists and bicyclists. Where possible, parallel routes were identified and proposed to alleviate this need. The evaluation and improvement of intersections along these corridors will also be weighed more heavily when determining intersection improvement priorities. As mentioned, this will be a separate process conducted through the implementation of this Plan. Some of these roads are under the control of the Texas Department of Transportation (TxDOT) and will require a collaborative effort to become multi-modal.

Below is a list of roads with constraints:

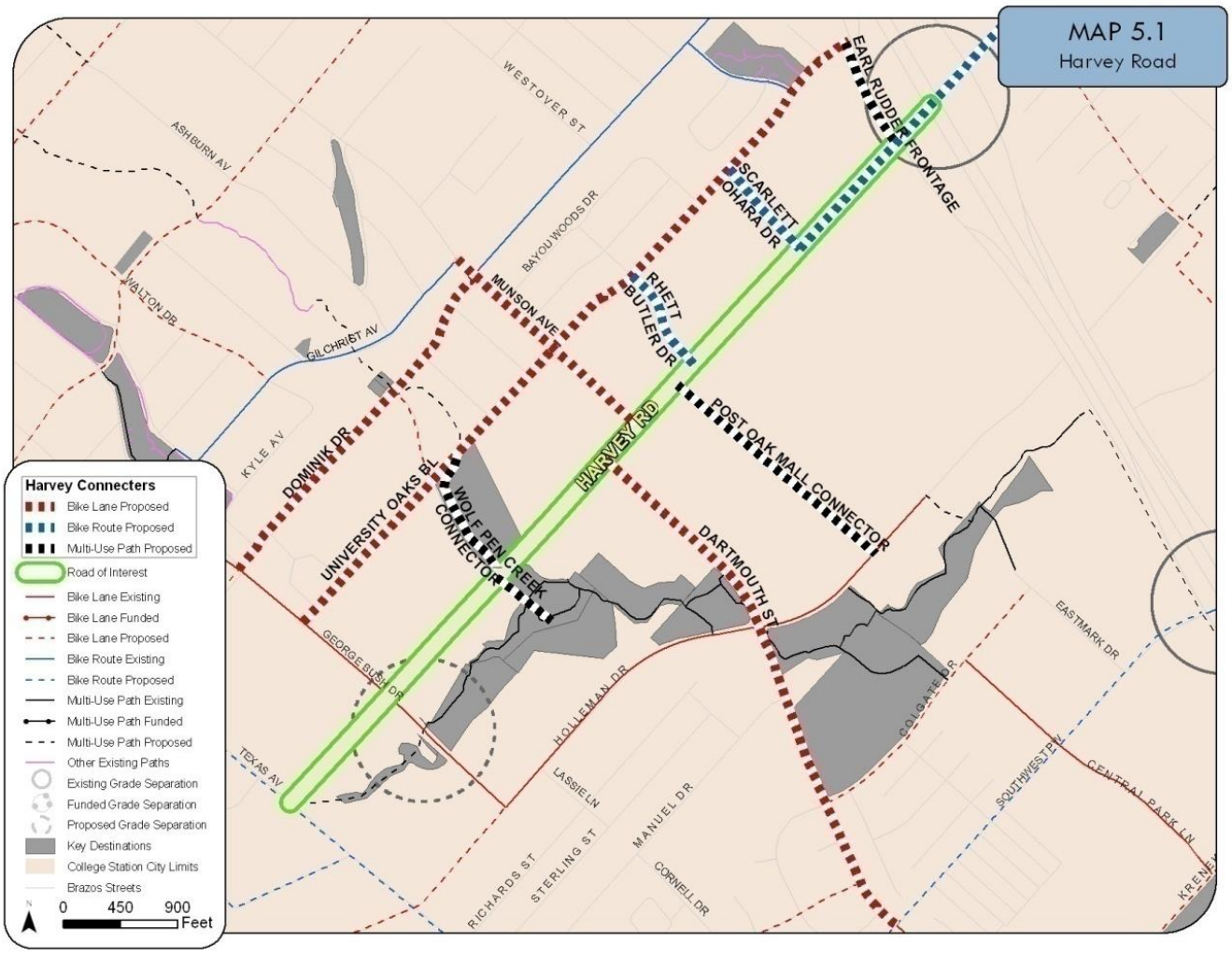
- **Harvey Road [SH 30 – TxDOT]** – (Pedestrian and Bicycle Facilities) Currently, there are no plans for reconstruction of this street and there may not be enough right-of-way to accommodate all types of bicyclists. This corridor, however, has high student population density and provides access to key destinations, including restaurants and shopping centers that bicyclists and pedestrians desire to reach safely and conveniently. Additional steps will need to be taken to further explore, evaluate, and analyze the possibilities available for this road. Sidewalks on both sides are proposed along this corridor. A bike route exists east of Earl Rudder Freeway [SH 6] and is proposed to the west to create a connection as described in the bike route portion of this chapter. Alternate bicycle facilities that are proposed (also referenced under its respective section) and will be important to implement for bicyclists to travel through and to this corridor are shown on Map 5.1 and include:

  - Multi-use Path
    - → Connector Facility
      - Earl Rudder Freeway [SH 6] frontage road (Harvey Road [SH 30] to University Oaks Boulevard)
      - Post Oak Mall (Harvey Road [SH 30] to Holleman Drive)
      - Wolf Pen Creek (University Oaks Boulevard to Wolf Pen Creek Trail)
  - Bike Routes
    - → Harvey Road [SH 30] (Earl Rudder Freeway [SH6] to Scarlett O'Hara Drive) The multi-use path, proposed above, however, would be preferred over this bike route especially to accommodate less experienced bicyclists.
    - → Connector Facilities
      - Scarlett O'Hara Drive (University Oaks Boulevard to Harvey Road [SH 30])
      - Rhett Butler Drive (University Oaks Boulevard to Harvey Road [SH30])
  - Bike Lanes
    - → Parallel Facilities

- University Oaks Boulevard (Earl Rudder Freeway [SH 6] frontage road to George Bush Drive [FM 2347])
- Dominik Drive (Munson Avenue to Texas Avenue[BUS 6])

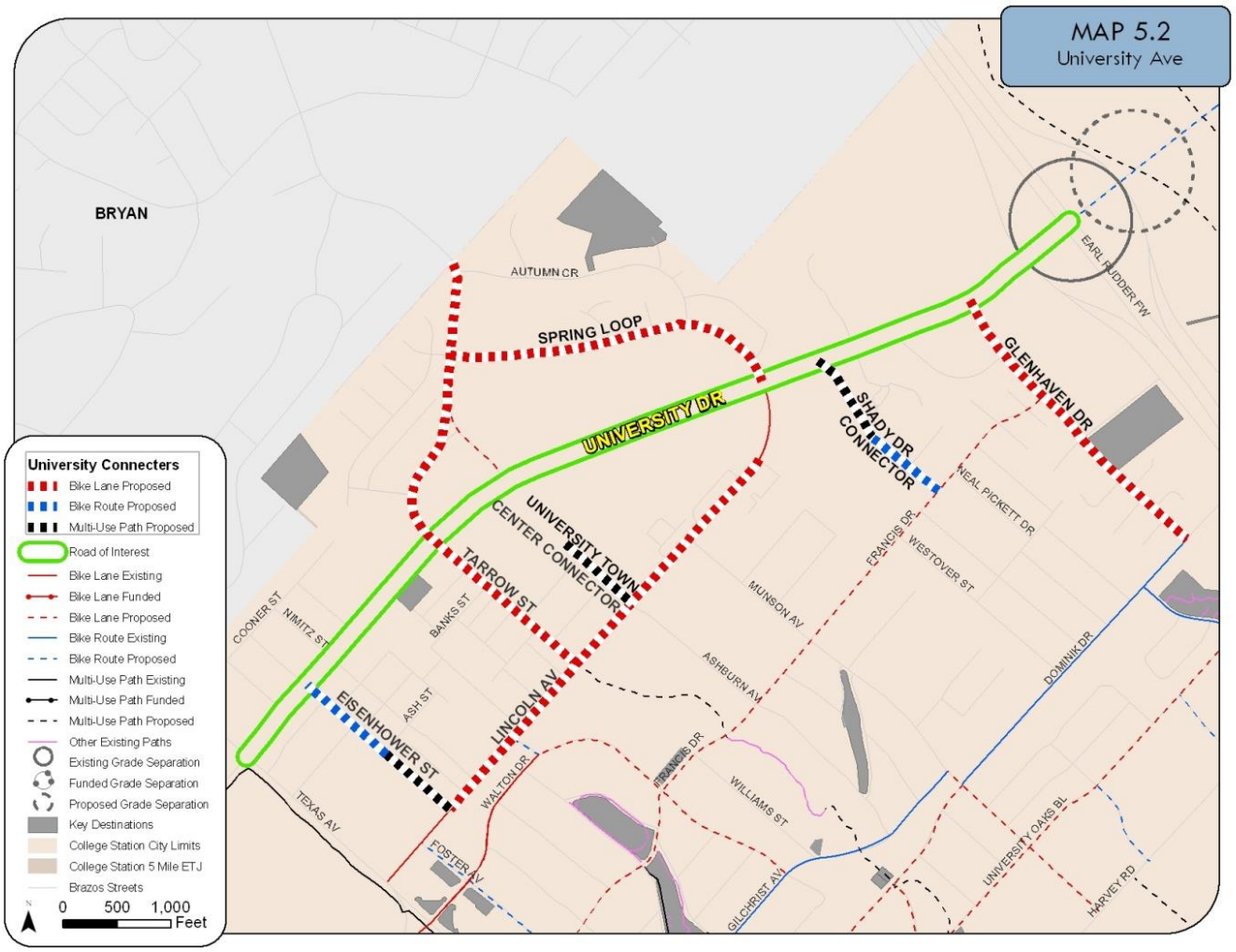
→ Connector Facilities

- Munson Avenue (Dominik Drive to Harvey Road [SH 30])
- Dartmouth Street (Harvey Road [SH 30]to Southwest Parkway)



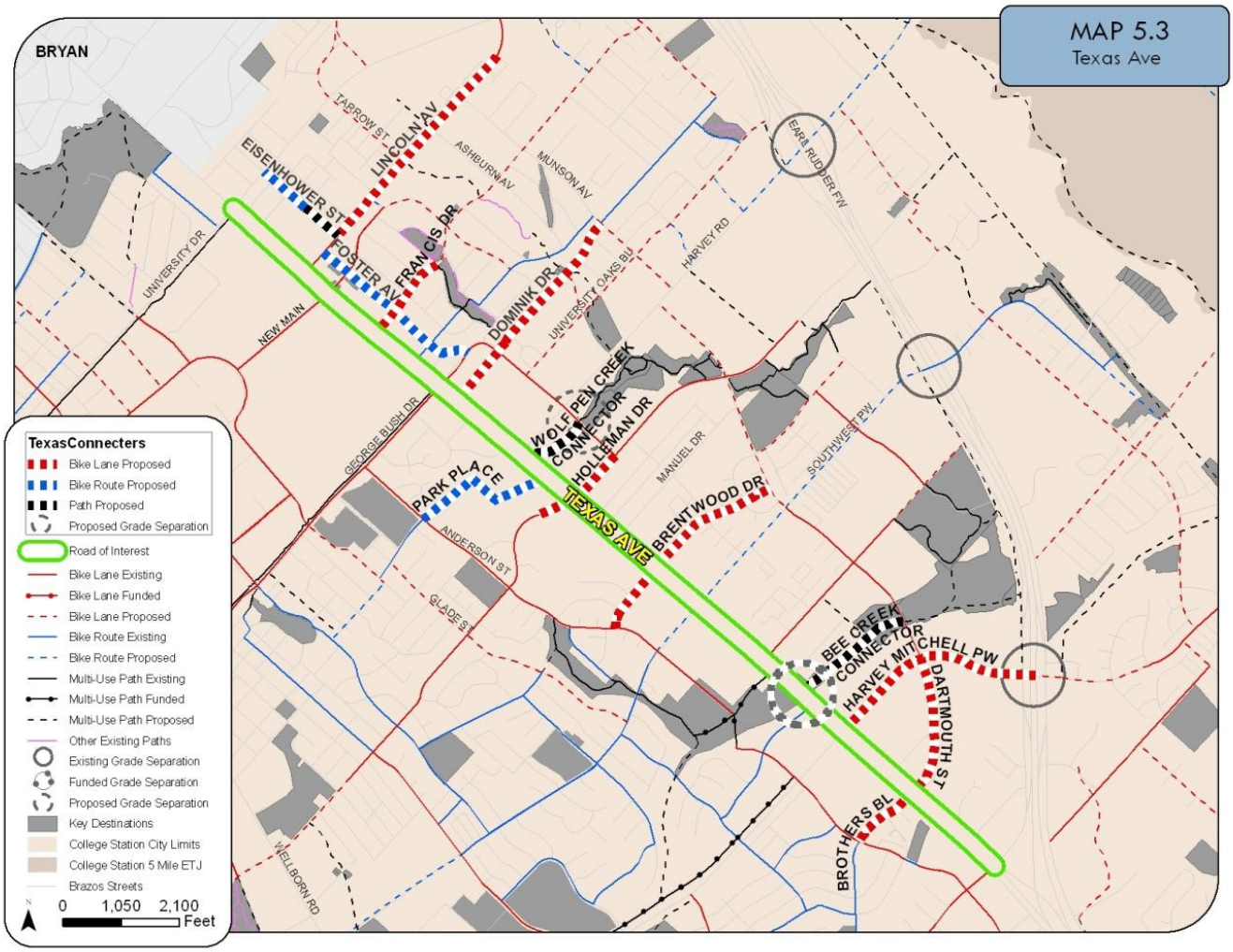
- **University Drive [FM 60 – TxDOT] (Texas Avenue [BUS 6] to Earl Rudder Freeway [SH6])** – (Pedestrian Facilities on a small portion and Bicycle Facilities) Currently, there are no plans for reconstruction of this street and there may not be enough right-of-way to accommodate all types of bicyclists. However, it has been identified by the City's Comprehensive Plan as the Hospitality Corridor and provides access to key destinations, including hotels, restaurants, and shopping centers that bicyclists and pedestrians desire to reach safely and conveniently. The City also plans to develop a convention center along this corridor in the future. Additional steps will need to be taken to further explore, evaluate, and analyze the possibilities available for this street. Sidewalks exist on both sides for the majority of this street, except for a section closest to Texas Avenue [BUS 6] where a sidewalk is proposed. Alternate bicycle facilities that are proposed (also referenced under its respective section) and will be important to implement for bicyclists to travel through and to this corridor are shown on Map 5.2 and include:

  - Multi-use Path
    - Connector Facilities
      - Lincoln Avenue to University Town Center
      - Eisenhower Street (Lincoln Avenue to Ash Street)
      - Shady Drive (Shady Drive to University Drive [FM 60])
  - Bike Routes
    - Connector Facility
      - Eisenhower Street (University Drive [FM 60] to Ash Street)
      - Shady Drive (Francis Drive to Shady Drive Connector multi-use path)
  - Bike Lanes
    - Parallel Facilities
      - Lincoln Avenue (Eisenhower Street to Grand Oaks Circle)
      - Spring Loop (Tarrow Street to University Drive [FM 60])
    - → Connector Facility
      - Tarrow Street (Bryan City limits to Lincoln Avenue



- **Rock Prairie Road (Wellborn Road [FM 2154] to Earl Rudder Freeway [SH 6])** – (Bicycle Facilities) Currently, there are no plans for reconstruction of this street and there may not be enough right-of-way to accommodate all types of bicyclists. Unless one or more of these factors change, this street will not be able to accommodate all types of bicyclists.

- **Texas Avenue [BUS 6 – TxDOT] (George Bush Drive [FM 2347] to Harvey Mitchell Parkway [FM 2818])** – (Bicycle Facilities) Accommodations on this street were requested by many bicyclists. It was designed with a wide outside lane that could be utilized by bicyclists. Consideration will be given to creating a bicycle route on Texas Avenue [BUS 6] with the use of signage and sharrows. This corridor has a number of key destinations that are hard to reach through another route. Less experienced bicyclists, however, are encouraged to use other bicycle facilities due to the high traffic volume and speed limit. Alternate bicycle facilities that are proposed (also referenced under its respective section) and will be important to implement for bicyclists to travel through and to this corridor are shown on Map 5.3 and include:
  - Multi-use Paths
    - → Parallel Facility
      - Eisenhower Street (Lincoln Avenue to Ash Street)
    - → Connector Facilities
      - Wolf Pen Creek (Texas Avenue [BUS 6] to George Bush Drive East)
      - Bee Creek (Texas Avenue [BUS 6] to Central Park)
  - Bike Routes
    - → Parallel Facilities
      - Foster Avenue (Lincoln Avenue to George Bush Drive East)
      - Eisenhower Street (University Drive [FM 60] to Ash Street)
    - → Connector Facility – Park Place (Anderson Street to Texas Avenue [BUS 6])
  - Bike Lanes
    - → Connector Facilities
      - Brentwood Drive (Anderson Street to Dartmouth Street)
      - Brothers Boulevard (Texas Avenue [BUS 6] to Anderson Street)
      - Dartmouth St (Texas Avenue [BUS 6] to Harvey Mitchell Parkway [FM 2818])
      - Dominik Drive (Munson Avenue to Texas Avenue [BUS 6])
      - Francis Drive (Texas Avenue [BUS 6] to Puryear Drive)
      - Harvey Mitchell Parkway [FM 2818] (Texas Avenue [BUS 6] to Earl Rudder Freeway [SH 6])
      - Holleman Drive (near Texas Avenue [BUS 6] to George Bush Drive [FM 2347])
      - Lincoln Avenue (Eisenhower Street to Grand Oaks Circle)
  - Grade Separated Crossing
    - → Bee Creek
    - → Wolf Pen Creek



- **Wellborn Road [FM 2154 – TxDOT]** – (Pedestrian Facilities {some portions} and Bicycle Facilities {some portions}) A section of this street from Southwest Parkway to William D. Fitch Parkway [SH 40] is under construction and will have wide outside lanes and a sidewalk on the east side. This street, however, has a very few destinations along its corridor and has constrained right-of-way from George Bush Drive [FM 2347] to Southwest Parkway in some locations. For these reasons, bicyclists are encouraged to use alternate routes such as parallel facilities, including Welsh Avenue/Victoria Avenue or Anderson Street/Longmire Drive. These alternate routes will allow bicyclists to reach key destinations in a safer manner. It will not be considered for additional bicycle improvements, though sidewalks are proposed from Southwest Parkway to University Drive [FM 60].

Bike Lanes

A bike lane is a designated bicycle facility on part of the street that is striped, signed, and has pavement markings for the exclusive or preferential use of bicyclists. Bicyclists need a place to travel that is safe and convenient. Although bicyclists have the right to use an entire travel lane, designating a bicycle lane creates awareness for the motorist and reduces stress levels for the bicyclist. A study conducted in 2006 by the Center for Transportation Research, University of Texas for the Texas Department of Transportation determined that on-street bicycle facilities (bike lanes) prevent over-correction by drivers, creating a safer environment for bicyclists and motorists. In 1996, over 2000 League of American Bicyclist members were surveyed about the crashes in which they were involved over the course of the previous year. From the information provided, a relative danger index was calculated which showed that streets with bike lanes were the safest places to ride, having a significantly lower crash rate then either major or minor streets without any bicycle facilities.

There are currently 33 miles of bike lanes in College Station and four additional miles that are funded as shown on Map 2.10: Existing Bicycle Facilities. Some are listed below:

- Anderson Street with a connection through Bee Creek Park (currently under development) and over Bee Creek with a bridge to Longmire Drive;
- Arrington Road (Decatur Drive to William D. Fitch Parkway [SH 40]);
- College Main (University Drive [FM 60] to Bryan City limits);
- George Bush Drive [FM 2347](Texas Avenue [BUS 6] to Wellborn Road [FM 2154]);
- Dartmouth (Southwest Parkway to Harvey Mitchell Parkway [FM 2818]);
- Deacon Drive(Wellborn Road [FM 2154] to Texas Avenue [BUS 6]);
- Graham Road (Earl Rudder Freeway [SH 6] frontage road to Wellborn Road [FM 2154]);
- Holleman Drive (Carolina Street to Texas Avenue [BUS 6] – 700 ft before);
- Marion Pugh Drive(George Bush Drive [FM 2347] to Holleman Drive);
- Rio Grande Boulevard (Harvey Mitchell Parkway [FM 2818]to Rock Prairie Road);
- Victoria Avenue(Barron Road to Rock Prairie Road);
- Walton Drive (Texas Avenue [BUS 6] to Nunn Street);
- William D. Fitch Parkway [SH 40] (Lakeway Drive to Pebble Creek Parkway); and
- Welsh Avenue (Holleman Drive to Rock Prairie Road).

Proposed Bike Lanes

This plan proposes an additional 130 miles of bike lanes as shown in Map 5.4: Proposed Bicycle Facilities. Some have been carried over from the 2002 Bikeway and Pedestrian Master Plan. Many create connections between existing facilities and others are proposed on future roads expected with growth and development. A number of corridors are referenced below:

- Brentwood Drive (Anderson Street to Dartmouth Street);
- Dartmouth Street (Harvey Road [SH 30]to Southwest Parkway);
- Decatur Drive (Barron Road to Arrington Road - Anderson Street to Longmire Drive will continue to Arrington Road with the addition of bike lanes on Decatur Drive and Barron Road);
- Dominik Drive (Munson Avenue to Texas Avenue [BUS 6]);
- Eagle Avenue (William D. Fitch Parkway [SH 40] to Earl Rudder Freeway [SH 6] Frontage Road);
- Foxfire Drive/Stonebrook Drive (Sebesta Road to Rock Prairie Road);
- Glade Street (Park Place to Southwest Parkway);
- Lincoln Avenue (Eisenhower Street to Grand Oaks Circle);
- Nagle Street (Bryan City limits to University Drive [FM 60]);
- Navarro Drive (Wellborn Road [FM 2154] to Welsh Avenue);
- Newport Lane (Eagle Avenue to Southern Plantation Drive);
- Spring Loop (Tarrow Street to University Drive [FM 60]);
- Southern Plantation Drive (Victoria Avenue to Earl Rudder Freeway [SH 6] Frontage Road); and
- Tarrow Street (Bryan City limits to Lincoln Avenue).

Bike Routes

A bike route is a street that is shared by both bicycles and motor vehicles. It is marked with appropriate signage and may have shared lane markings also called sharrows (see Figure 5.1). The City will consider introducing sharrows with some bike routes as described in Appendix M: Design Considerations through the implementation of this Plan. A bike route can include a street with wide outside lanes or a paved shoulder. It should provide connections to bike lanes and multi-use paths. Preferences for designating bike routes include low speed limits and low traffic volumes. These ideal

FIGURE 5.1: EXAMPLE OF A SHARROW

conditions, however, are not always possible where a route is needed to provide a bicyclist with a connected system and may require the addition of some high speed limits and high traffic volume streets.

There are currently 59 miles of bike routes, although a number of them are proposed to become bike lanes in this Plan which will change the number of bike routes miles to 32 upon build-out. Some are listed below:

- Brothers Boulevard (Longmire Drive to Ponderosa Drive);
- Dexter Drive (George Bush Drive [FM 2347]to Southwest Parkway);
- Gilchrist Avenue (Texas Avenue [BUS 6] to Glenhaven Drive);
- Haines Drive (Dexter Drive to Glade Street);
- Langford Street (Haines Drive to Guadalupe Drive); and
- Raintree Drive (Earl Rudder Freeway [SH 6] to Sumter Drive).

Proposed Bike Routes

This Plan proposes an additional 80 miles of bike routes as shown on Map 5.4: Proposed Bicycle Facilities. Some have been carried over from the 2002 Bikeway and Pedestrian Master Plan. Many create connections between existing facilities, while others are proposed on future roads expected with growth and development in rural areas. A number of corridors are referenced below:

- Cross Street (Nagle Street to College Main);
- Foster Avenue (Lincoln Avenue to George Bush Drive East);
- Frost Drive (Foxfire Drive to Bird Pond Road);
- Harvey Road [SH 30 – TxDOT] (Scarlett O'Hara Drive to Associate Avenue);
  - This corridor has a number of key destinations that are hard to reach through another route. Less experienced bicyclists are encouraged to use other bicycle facilities if possible.
- Park Place (Anderson Street to Texas Avenue [BUS 6]);
- Southwest Parkway (Wellborn Road [FM 2154] to Welsh Avenue and Anderson Street to Earl Rudder Freeway [SH6] Frontage Road);

- With limited right-of-way and high traffic volumes, the street is constrained and not ideal as a bicycle route. It is, however, a corridor that is needed by bicyclists to reach key destinations. Less experienced bicyclists are encouraged to use other bicycle facilities. The addition of proposed bike lanes on Brentwood Drive (Anderson Street to Dartmouth Street), Colgate Drive (Dartmouth Street to Eastmark Drive), and Dartmouth Street (Harvey Road [SH 30] to Southwest Parkway) will be important.

PEDESTRIAN FACILITY RECOMMENDATIONS

Pedestrian facilities include sidewalks and multi-use paths (greenway trails and side paths). Sidewalks are described below and multi-use paths are discussed under greenways recommendations. A number of corridors will require additional evaluation and analysis before determining if a proposed facility can be accomplished. Constraints may include limited right-of-way, mature trees, or existing utilities, among other things, that would be too costly to relocate. If constrained rights-of-way exist, the use of a road diet may be considered on roadways with lower traffic volumes. Some of these roads are under the control of the Texas Department of Transportation (TxDOT) and will require a collaborative effort to become multi-modal.

Sidewalks

A sidewalk is a paved walkway for pedestrians that is typically alongside a street. It is preferred that a landscaped buffer be placed between the sidewalk and street rather than only a curb, although both options currently exist. The buffer creates a separation between pedestrians and motor vehicles that creates a safe place to walk. The landscaping, however, should not obstruct views for safety and security reasons. Some streets or sections of streets only have a sidewalk on one side, which is less than desirable in most cases. Many are local subdivision streets while others are collectors and arterials. Sidewalks should be required on both sides of all new local subdivision streets. As mentioned previously, whether a sidewalk is located on one or both sides of a street was not addressed herein but collectors and arterials will be evaluated during the implementation of this Plan.

There are currently 130 miles of sidewalks in College Station and 7 additional miles that are funded as shown on Map 2.10: Existing Bicycle Facilities. Some are listed below:

- Alexandria Avenue (Deacon Drive (Wellborn Road [FM 2154] to Texas Avenue [BUS 6]);
- Eagle Avenue (William D. Fitch Parkway [SH 40] to Earl Rudder Freeway [SH 6]);
- Emerald Parkway (Earl Rudder Freeway [SH 6] to Bent Oak Street);
- Graham Road (Wellborn Road [FM 2154] to Earl Rudder Freeway [SH 6] Frontage Road);
- Harvey Mitchell Parkway [FM 2818] (Texas Avenue [BUS 6] to Earl Rudder Freeway [SH 6]);
- Texas Avenue [BUS 6](University Drive [FM 60] to Harvey Mitchell Parkway);
- Rio Grande Boulevard (Harvey Mitchell Parkway [FM 2818] to Rock Prairie Road);
- Rock Prairie Road (Wellborn Road [FM 2154] to Earl Rudder Freeway [SH 6]);
- Southwest Parkway (Wellborn Road [FM 2154] to Earl Rudder Freeway [SH 6]);
- University Drive [FM 60] (Agronomy Road to Earl Rudder Freeway [SH 6]);
- Victoria Avenue (Rock Prairie Road to Barron Road); and
- Welsh Avenue (Holleman Drive to Rock Prairie Road).

Proposed Sidewalks

This plan proposes an additional 113 miles of sidewalks, as shown in Map 5.5: Proposed Pedestrian Facilities. Many create connections between existing facilities and others are proposed on future roads expected with growth and development. They, however, only encompass roads that are a part of the Thoroughfare Plan. Additional sidewalks will be built on local subdivision streets as new development occurs and are not a part of this Plan. A few of the corridors proposed are below:

- Fairview Avenue (George Bush Drive [FM 2347]to Luther Street);
- Foxfire Drive (Sebesta Road to Timber Knoll Drive);
- Guadalupe Drive (Nueces Drive to Langford Street);
- Harvey Road [SH 30](Texas Avenue [BUS 6] to Earl Rudder Freeway [SH 6])
    - Although sections have a sidewalk on one side, this corridor has a number of key destinations and gaps that prevent connectivity.
- Langford Street (Southwest Parkway to Guadalupe Drive)
- Park Place (Dexter Drive to Texas Avenue [BUS 6])
- Pedernales Drive (Balcones Drive to Val Verde Drive)
- Tarrow Street (Bryan City limits to Lincoln Avenue)
- Todd Trail (Rio Grande Boulevard to Southwood Drive)

GREENWAY RECOMMENDATIONS

Greenways include open space or stream corridors and multi-use paths (greenway trails or side paths). Multi-use paths are described below. As referenced in Chapter 3: Needs Assessment, greenways have numerous benefits and accomplish multiple goals. They help protect the environment, can create an alternate mode of transportation, encourage healthy living, provide opportunities for recreation, and generate economic activity. A greenway may or may not have a multi-use path.

Greenways

Greenways currently include the stream corridors and other open space (e.g., utility corridors) within College Station City limits. This includes Alum Creek, Bee Creek, Carters Creek, Lick Creek, Spring Creek, Wolf Pen Creek, and their tributaries. Three different types of greenways exist: urban, suburban, and rural and are described in more detail below. College Station currently has about 500 acres of publicly owned greenway property across the City which has been acquired through voluntary dedication/donation and fee simple acquisition. Figure 5.2 provides a breakdown of acres by stream corridor.

Stream Corridor	Acres
Alum Creek	54
Bee Creek	78
Carters Creek	10
Lick Creek	174
Spring Creek	164
Wolf Pen Creek	38

FIGURE 5.2:
STREAM CORRIDORS BY ACRES

Proposed Greenways

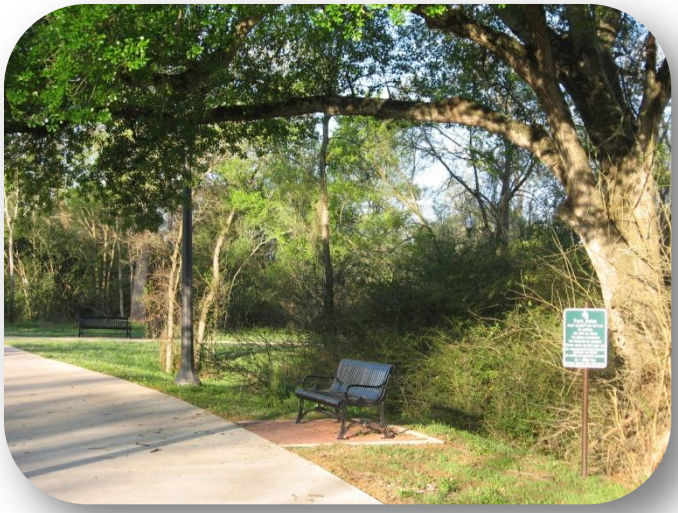
Greenways should include all stream corridors and their floodplain as well as delineated riparian areas within the College Station City limits and the five-mile Extraterritorial Jurisdiction. The riparian area should begin along the length of a stream where the watershed drains 32 acres or more. The riparian area width will be dependent upon the objective to be achieved. Various objectives can be accomplished with a riparian area including stream bank stabilization; floodplain and storm water management; water quality protection; and wildlife and aquatic habitat protection. The riparian area width will be wider based on the objective. The minimum width should consider the need for stream bank stabilization.

An acreage number for greenways is not proposed due to a number of factors that can affect how many acres can be protected. This includes land use changes, development, and costs for

the property. Performances measures, however, will be established to strive to protect a set amount each year.

Greenways are classified into three different types based on function: urban, suburban and rural. Characteristics include connectivity, access, corridor width, trail type, development inside the greenway, and development surrounding the greenway. A description of each is available below. Map 5.6: Greenways by Type provides the greenway type by stream corridor.

Urban Greenways



Urban greenways are in areas that have the most intense development activities. Their primary function is to provide for flood control, transportation, recreation, economic, and aesthetic purposes. Wildlife protection and service as a utility corridor are secondary functions.

Urban greenways will provide connections between urban areas and surrounding areas with very intense development activities. The width of the corridor will be determined by the Federal Emergency Management Agency's designated special flood hazard areas (1% annual chance flood event or 100-year floodplain) and riparian area. Additional width needed will be dependent upon the health of the stream and need for additional right-of-way for trail development. The trail within the corridor will be designed to handle bicycle and pedestrian traffic. Highly visible access to greenway trails will occur at frequent intervals between the surrounding development and the corridor. It will be a 10 to 12 foot wide trail, having an all- weather and accessible surface. Urban greenways will be used quite intensively simply because of where they are located and the surrounding land uses. Improvements to the channel should occur only as needed using the least disruptive technique possible. Bridge structures should provide separation of grade to allow for safe and convenient passage of users. Development surrounding urban greenways will typically occur at the highest intensity, will be in close proximity to the edge of the corridor, and should be sensitive to the stream. This development will primarily include high-density apartments, duplexes, and townhomes, as well as general commercial, offices, businesses, and vertical mixed-use. An example of an urban greenway in College Station is Wolf Pen Creek. Figure 5.2 provides a table of this information for easy reference.

Urban Greenways	
Primary Function	Flood Control Transportation Recreation Economics Aesthetics
Secondary Function	Protect Wildlife Utility Corridor
Connection	Many connections between intense development areas
Access	Highly visible Variety of types
Corridor Width	FEMA special flood hazard areas and riparian area Additional width dependent upon health of stream and need for additional right-of-way for trail development
Trail Type	All-weather and accessible surfaces Multi-use for bicyclists and pedestrians Transportation and recreation
Development within the Greenway	Highest intensity of use Channel improvements made only if necessary using the disruptive technique feasible Bridge structures should provide separation of grade to allow for safe and convenient passage of users
Development outside of the Greenway	Highest intensity use and in close proximity to the floodway Sensitive to the stream Primarily multi-family residential and general commercial uses, offices, and vertical mixed-use

FIGURE 5.3: URBAN GREENWAYS

Suburban Greenways

As with urban greenways, the primary functions served by suburban greenways will be to provide for flood control, recreation, and transportation, as well as to serve economic and aesthetic purposes. Wildlife protection and service as a utility corridor will be secondary functions.

Picture source: www.indianatrails.org

Suburban greenways will provide connections between neighborhoods and surrounding neighborhood commercial uses, offices, parks, and schools. There will be moderate to high levels of use. Access points will be prominent for easy visibility and may include lighting, signage, or picnic areas. The width of a suburban greenway should be the entire floodplain and riparian area, whichever is greater, or if surrounding development is present, that which can reasonably be obtained. The trails will serve a variety of recreational and transportation uses and will be relatively wide with an all- weather and accessible surface. Channel improvements should only be made if necessary, using the least disruptive techniques feasible. Bridge structures should provide grade separation for safe passage of users. Surrounding development will consist of high-density single-family residential uses, some townhomes and duplexes, as well as neighborhood commercial uses and offices. Examples of what could someday be suburban greenways in College Station are portions of Bee Creek and Wolf Pen Creek, west of Texas Avenue [BUS 6], and Lick Creek and Spring Creek from their beginnings to their confluence with Alum Creek.

Suburban Greenways	
Primary Function	Flood Control Transportation Recreation Economics Aesthetics
Secondary Function	Protect Wildlife Utility Corridor
Connection	Between user and destination Many connections between neighborhoods and surrounding neighborhood commercial uses, offices, parks, and schools.
Access	Prominent access points for easy visibility (may include lighting, signage, picnic areas, etc.)

Corridor Width	Entire floodplain and riparian area (or if surrounding development is present what can reasonably be obtained)
Trail Type	All-weather and accessible surface; multi-use for bicyclists and pedestrians; transportation and recreation
Development within the Greenway	Channel improvements made only if necessary using the least disruptive techniques feasible Bridge structures should provide separation of grade to allow for safe and convenient passage of users
Development outside of the Greenway	High-density single family Low- to medium-density multi-family Neighborhood commercial and office uses

FIGURE 5.4 SUBURBAN GREENWAYS

Rural Greenways

The primary functions of rural greenways are to control flooding, protect wildlife, and increase aesthetic value. Recreation, transportation, economics, and service as a utility corridor will serve as secondary functions.

This type of greenway would exist in a mostly "natural" state with connections made for wildlife movement and some trails developed for public use. Riparian areas would see very little, if any, modification. Greenway trails would be more primitive, designed for lower levels of use and may connect larger nature oriented parks or preserves. User amenities would be less common and found only at destination points. The corridor width would contain the entire floodplain and possibly more in some areas to include key natural or cultural areas, as well as riparian areas. There would be limited channel improvements allowed and bridge structures would be grade separated to allow safe passage of pedestrians and bicyclists. The surrounding land uses would be primarily rural and estate with ranches, farmsteads, and large-lot residential developments or low-density single-family residential. As it currently exists, much of the Carters Creek floodplain would be an example of this type of greenway.

Rural Greenways	
Primary Function	Protect Wildlife Flood Control Aesthetics
Secondary Function	Transportation Recreation Economics Utility Corridor
Connection	Limited connections to man-made features Strongest connections to natural features Developed with wildlife movement in mind
Access	Minimal access to allow for a low level of human use
Corridor Width	Entire floodplain and riparian area (possibly wider in some areas to include key natural and cultural areas)
Trail Type	Paved or Unpaved
Development within the Greenway	Limited trails developed either for connections or for access to and from destination points Some park-like amenities located at destination points (parking, picnic areas, interpretive facilities, restrooms, etc.)
Development outside of the Greenway	Rural and Estate Ranches, farmsteads, large-lot residential Low-density single-family residential

FIGURE 5.5: RURAL GREENWAYS

Multi-use Paths

Multi-use paths consist of greenway trails and side paths. They are closed to motorized traffic and are designed for two-way travel by bicyclists and pedestrians. As described above, a multi-use path should be an all-weather surface and accessible within urban and suburban greenways. The minimum width is between 10 to 12 feet depending on anticipated use. Multi-use paths should also connect to regional paths wherever possible.

Greenway trails are paths separated from the street, wherever possible, buffered by open space or stream corridors, as well as utility right-of-way or abandoned railroad right-of-way.
A side path follows a road corridor. Side paths are only appropriate for bicyclists if there are a limited number of driveways and intersections. The multi-use paths proposed along streets were considered with this in mind. There are currently about eight miles of multi-use paths in the City of College Station and six additional miles that are funded. These include multi-use paths at the following locations:

- Bee Creek Park;
- Stephen C. Beachy Central Park;
- Lemontree Park;
- Lick Creek (from Creek View Elementary to Lick Creek Park) – Funded;
- Wolf Pen Creek (from George Bush Drive [FM 2347]to Earl Rudder Freeway [SH 6]); and
- Sidepaths.
  - Around Texas A&M Central Campus
  - Along Harvey Mitchell Parkway [FM 2818] – Under development

Proposed Multi-use Paths

This Plan proposes an additional 43 miles of multi-use paths, as shown on Map 5.4: Proposed Pedestrian Facilities. Some have been carried over from the 2002 Bikeway and Pedestrian Master Plan. Others create connections between existing facilities and many are proposed along stream corridors. A number of proposed multi-use paths will require additional evaluation and analysis before determining the specific alignment. A few of the corridors proposed include the following:

- Alum Creek (Earl Rudder Freeway [SH 6] to Gulf States Utility Easement);
- Bee Creek (Texas Avenue [BUS 6] to Earl Rudder Freeway [SH6]);
- Carters Creek (Bryan City limits to Lick Creek Park);
- Gulf States Utility Easement (Bryan City limits to southern end of College Station City limits);
- Earl Rudder Freeway [SH 6] (Wolf Pen Creek multi-use path to Harvey Mitchell Parkway [FM 2818]);
- Spring Creek (Barron Road to Pebble Creek Parkway); and
- William D. Fitch Parkway [SH 40] (Graham Road to Earl Rudder Freeway [SH 6]).

GRADE SEPARATED CROSSING RECOMMENDATIONS

A grade separated crossing is a structure over or under a barrier such as a street, railroad, or stream. The grade separation can consist of either an overpass (bridge) or underpass (mainly a culvert) that separates bicyclists and pedestrians from the barrier. It provides a safe, continuous crossing with fewer conflicts.

Grade separated crossings can be costly to implement and should be planned well in advance. All current grade separated crossings exist in conjunction with either a street separated crossing along Earl Rudder Freeway [SH 6] or Wellborn Road [FM 2154] and are TxDOT facilities. Some existing grade separated crossings are shown as proposed since they do not accommodate pedestrians and may be less than desirable for bicyclists. A list of those that currently accommodate bicyclists and pedestrians in some fashion include the following:

- Earl Rudder Freeway [SH 6] and Barron Road – sidewalks on both sides and bike lanes on Barron Road (Currently under development);
- Earl Rudder Freeway [SH 6] and Harvey Mitchell Parkway [FM 2818]/Emerald Parkway – sidewalks on both sides of Harvey Mitchell Parkway [FM 2818];
- Earl Rudder Freeway [SH 6] and Harvey Road [SH 30] – sidewalks on both sides of Harvey Road [SH 30];
- Earl Rudder Freeway [SH 6] and Southwest Parkway – sidewalk on one side of Southwest Parkway;
- Earl Rudder Freeway [SH 6] and University Drive [FM 60] – sidewalks on both sides of University Drive [FM 60];
- Earl Rudder Freeway [SH 6] and William D. Fitch Parkway [SH 40] – sidewalk on one side of William D. Fitch Parkway;
- Wellborn Road [FM 2154] and Harvey Mitchell Parkway [FM 2818] – sidewalk on one side of Wellborn Road (Currently under development); and
- Wellborn Road [FM 2154] and University Drive [FM 60] – sidewalks on both sides of University Drive [FM 60].

Proposed Grade Separated Crossings

This plan proposes an additional 11 grade separated crossings, as shown on Map 5.3 and 5.4. Most were carried over from the Thoroughfare Plan and will be developed in conjunction with improvements to the street with the exception of three stream crossings. As with other proposed facilities, they will require additional evaluation and analysis. The absence of sidewalks on existing grade separated crossings triggered their addition to this list. This, however, provides the opportunity to explore other bicycle facility accommodations for bicyclists who may be uncomfortable on the street and may need a designated facility. A few of the corridors proposed include the following:

- Bee Creek at Texas Avenue [BUS 6];

- Carters Creek at University Drive [FM 60];
- Earl Rudder Freeway [SH 6] and Rock Prairie Road;
- Wolf Pen Creek at George Bush Drive [FM 2347].

POLICY RECOMMENDATIONS

The following proposed policies are intended to ensure the effective accommodation and improved mobility of bicyclists and pedestrians, as well as the protection of greenways. They provide a framework through which the City of College Station can achieve the continued expansion of the system in the short and long term.

- All facilities should be designed in compliance with the Americans with Disabilities Act (ADA) and in accordance with the Manual of Uniform Traffic Control Devices (MUTCD), American Association of State Highway and Transportation Officials (AASHTO), and other federal, state, and local applicable guidelines.
- Context Sensitive Solutions should be employed as a part of the implementation of the proposed system.
- All new and reconstructed collectors, arterials, and grade separated crossings should be planned and designed to ensure safe bicycle and pedestrian accommodations. Bicycle facilities on freeways and local subdivision streets may be considered based on context. Sidewalks should be required on both sides of all new local subdivision streets.
- A bicycle and pedestrian circulation plan should be required for new development and redevelopment to provide appropriate bicycle and pedestrian accommodations.
- On-street and off-street bicycle and pedestrian facilities should connect to one another.
- During street construction, requirements that ensure access and safety of bicyclists and pedestrians should be established to address disruptions and require detours with alternative routes.
- Adequate funding for operations and maintenance should be identified and appropriated during initial funding for land acquisition and facility development.
- Administrative and jurisdictional responsibilities, as well as maintenance schedules and standards, should be identified before land acquisition and during design of a facility.
- Crime Prevention through Environmental Design guidelines should be utilized for greenways, which recommend strategies for the built environment, including natural surveillance, territorial reinforcement, and natural access control.[17] This should be balanced with other development regulations.

[17] Crime Prevention through Environmental Design, <http://www.cpted.net/>

- The use of cul-de-sacs should be minimized by using a modified grid street system. Access ways should be provided for walking and bicycling where cul-de-sacs or dead end streets exist.
- Mixed-use development should be encouraged to create density that fosters a pedestrian and bicycle friendly environment.
- The greenway system should be expanded through the protection of floodplains, riparian areas, and other open spaces to connect neighborhoods, parks, schools, parks, transit and shopping centers.
- Best management practices should be utilized in the protection of floodplains, riparian areas, and other open space vegetation (e.g., trees, shrubs, and herbaceous vegetation) as well as the enhancement or restoration of impacted areas.
- The City of College Station should work with transit operators to integrate bicycling into the local transit system, including bicycle racks on buses, bicycle lockers, and bicycle parking at bus stops.
- The proposed system should reflect and be reflected in related planning documents by planning organizations at the local and state level to connect facilities into a regional system.